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EXAMINER				
ARCOS, CAROLINE H				
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2195				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/502,144

**Applicant(s)**

DIJKSTRA ET AL.

**Examiner**

CAROLINE ARCOS

**Art Unit**

2195

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 October 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-5 and 7-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05/05/2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/S508)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

1. Claims 1-5 and 7-13 are pending for examination.

#### *Specification*

2. The abstract of the disclosure is objected to because an abstract on a separate sheet is required.

Correction is required. See MPEP § 608.01(b)

3. Applicant is reminded of the proper content of an abstract of the disclosure.

A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

Where applicable, the abstract should include the following:

- (1) if a machine or apparatus, its organization and operation;
- (2) if an article, its method of making;
- (3) if a chemical compound, its identity and use;
- (4) if a mixture, its ingredients;
- (5) if a process, the steps.

Extensive mechanical and design details of apparatus should not be given.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-5 and 7-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- a. the claim language in the following claims is not clearly understood:

- i. As per claim 1, lines 14-15, it is not clearly understood whether the additional process having higher priority than one intermediate priority process and the high priority process or whether the additional process priority is between the intermediate and the highest priority process? (i.e. it is not clear where the additional process priority stands comparing it with other processes).
- ii. As per claim 2, line 2, it is unclear whether the execution/assigning step is done for the second time (i.e. done twice) or it is the same step as the one referred in claim 1, it is unclear whether “an additional process” is the same as “an additional process as claim 1 or it is a different process. (i.e. if it is the same step or the same process, they should be referred to said executing/assigning said process”) line 4, it is unclear how it is accomplished of having the additional process priority which is greater than the intermediate process priority to be equal to the effective priority of the low priority process.
- iii. As per claim 10, it has the same deficiency as claim 1.
- iv. As per claim 11, it has the same deficiency as claim 2.

- v. As per claim 13, it has the same deficiency as claim 1.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-2, 4-5, 7-8, 10-11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sha et al. ("Priority inheritance protocols: an approach to Real-time synchronization", IEEE, 1990, Pages 1175-1185), in view of Kush et al. (US 6,874,144 B1).
8. Sha et al. was cited on 8/06/2008 in PTO-892 form.
9. As per claim 1, Sha teaches the invention substantially as claimed including a method for prevention of priority inversion without priority promotion mechanism when executing processes with different priorities in a multiprocessing environment comprising execution of a low priority process and a high priority process and optionally at least one intermediate priority process having a priority between that of the low priority process and the high priority process, where the high priority process and the low priority process share a given resource, the method comprising the step of:
- temporarily raising an effective priority of the low priority process when the low priority process is going to use the shared resource (Pg. 1177, left col., lines 20-57; Pg. 1177, right col.,

Lines 1-23) where the additional process has a priority higher than the at least one intermediate priority process (pg. 1176, right col., lines 9-10; pg. 1177, left col. , lines 19-22).

10. Sha doesn't explicitly teach the multiprocessing environment and the step of raising the effective priority comprises executing/assigning an additional process accessing the shared resource on behalf of the low priority process.

11. However, Kush teaches the multiprocessing environment and raising the effective priority comprises executing/assigning an additional process accessing the shared resource on behalf of the low priority process (col. 5, lines 40-41; col. 5, lines 57-61; col. 6, lines 10-20; col. 7, lines 21-33) .

12. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Sha and kush teaching because Kush teaching of raising the effective priority comprises executing/assigning an additional process accessing the shared resource on behalf of the low priority process would improve system performance and throughput.

13. As per claim 2, Kush teaches the step of raising the effective priority comprises the steps of: executing/assigning an additional process accessing the shared resource on behalf of the low priority process where the additional process has a priority equal to the effective priority (col. 6, lines 10-20; col. 7, lines 21-33).

14. The combined teaching doesn't explicitly teach that the additional process is synchronized with the low priority process. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to conclude from Sha and Kush teaching that the additional process would have to be synchronized with a thread within itself because a process would not function properly otherwise.

15. As per claim 4, the combined teaching of Sha and Kush doesn't explicitly teach that the additional process and the low priority process are synchronized using a first semaphore and a second semaphore.

16. However, mutex are also referred to as binary semaphore and a process of the thread holding a semaphore could as well be accessing other shared resources with semaphores in order to make se of the combined shared resources together for a particular job. It would have been obvious to one of ordinary skill in the art that the time the invention was made to have used semaphore to access shared resources for a process and one for a thread within a process to make use of the combined resource held by the process as a whole such as simultaneous disk or printer access.

17. As per claim 5, Sha teaches the priority is raised at least until the low priority process has accessed or used the shared resource, or the high priority process has accessed or used the shared resource if the high priority process attempts to access or use the shared resource while the low priority process has access or uses the shared resource (pg. 1176, right col., lines 9-10;

pg. 1177, left col. , lines 19-22; Pg. 1177, left col., lines 20-57; Pg. 1177, right col., Lines 1-23).

18. As per claim 7, Kush teaches wherein access to the shared resource is controlled by a mutex (M) (col. 7, lines 20-33).

19. The combined teaching doesn't explicitly teach that whereby said additional process will not wait for the low priority process as long as it owns the mutex (M).

20. However, the combine teaching doesn't explicitly teach that said additional process will not wait for the low priority process as long as it owns the mutex. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to conclude that a calling thread not to wait for the whole process in order to carry out its tasks).

21. As per claim 8, Kush teaches the shared resource is selected from the group of: a shared memory, a shared file, and a shared input/output (I/O) device (col. 1, lines 32-36).

22. As per claim 10, it is the system claim of the method claim 1. Therefore, it is rejected under the same rational.

23. As per claim 11, it is the system claim of the method claim 2. Therefore, it is rejected under the same rational.



24. As per claim 13, it is the computer readable medium claim of the method claim 1.

Therefore, it is rejected under the same rational.

25. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sha et al.

("Priority inheritance protocols: an approach to Real-time synchronization", IEEE, 1990, Pages 1175-1185), in view of Kush et al. (US 6,874,144 B1) as applied to claim 1 above and further in view of Jones et al. ("Hard Real time with RTX on windows NT", USENIX, 1999, pages 1-10).

26. As per claim 9, the combined teaching of Sha and Kush doesn't explicitly teach the high priority process executes time-critical tasks.

27. However, Jones teaches the high priority process executes time-critical tasks (pg. 2, right col., lines 18-21).

28. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Sha, Kush and Jones because Jones teaching of high priority process executes time-critical tasks improve system efficiency by defining the priority of the process with the how critical the task accomplished which give priority to process needed by system the most such as Real time tasks.

29. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sha et al.

("Priority inheritance protocols: an approach to Real-time synchronization", IEEE, 1990, Pages

1175-1185), in view of Kush et al. (US 6,874,144 B1) as applied to claim 1 above and further in view of Jones et al. ("Hard Real time with RTX on windows NT", USENIX, 1999, pages 1-10) and in view of Werres et al (US 5,295,264).

30. As per claim 3, the combined teaching of Sha and Kush doesn't explicitly teach that the multiprocessor environment comprises a real-time operating system and a non-real time operating system running on a single processor at least at a given time, where the real-time operating system comprises said high priority process and said additional process and where the non-real time operating system comprises said low priority process.

31. However, Jones teach that the real-time operating system comprises said high priority process and said additional process and where the non-real time operating system comprises said low priority process.

32. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Sha, Kush and Jones because Jones teaching of real time task having high priority and non real time operating system having low priority task would improve system performance and efficiency in processing the real time application that has higher importance before the low priority task which is a non real time tasks.

33. The combined teaching of Sha, Kush and Jones doesn't explicitly teach that the multiprocessor environment comprises a real-time operating system and a non-real time

operating system running on a single processor at least at a given time.

34. However, Werres teaches the multiprocessor environment comprises a real-time operating system and a non-real time operating system running on a single processor at least at a given time (col. 2, lines 39-64).

35. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Kush, Jones and Werres because Werres teaching of he multiprocessor environment comprises a real-time operating system and a non-real time operating system running on a single processor at least at a given time which would improve system performance and throughput by saving on resource and having a compact system.

36. As per claim 12, it is the system claim of the method claim 3. Therefore, it is rejected under the same rational.

#### ***Response to Arguments***

37. Applicant's arguments with respect to claims 1-5 and 7-13 have been considered but are moot in view of the new ground(s) of rejection.

#### ***Conclusion***

38. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 6904483 B2 teaches System and method for priority inheritance.

US 6587955 B1 teaches Real time synchronization in multi-threaded computer systems.

US 6029190 A teaches Read lock and write lock management system based upon mutex and semaphore availability.

39. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CAROLINE ARCOS whose telephone number is (571)270-3151. The examiner can normally be reached on Monday-Thursday 7:00 AM to 5:30 PM.

40. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on 571-272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

41. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Supervisory Patent Examiner, Art Unit 2195

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